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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Takahiko Kondo

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EXAMINER

CHANG, VICTOR S

ART UNIT

PAPER NUMBER

1794

MAIL DATE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/550,005	Applicant(s) KONDO ET AL.	
	Examiner Victor S. Chang	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 2,3 and 6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,5 and 7-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Introduction***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/18/2008 has been entered. Applicants' declaration and remarks have been entered. Claims 1, 4, 5, 7-24 are active.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. In response to the amendments, the grounds of rejections have been rewritten as set forth below.

Rejections Based on Prior Art

4. Claims 1, 4, 5 and 7-24 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Takita et al. [US 6245272], and evidenced by Concise Encyclopedia of Polymer Science and Engineering, pp. 354.

Takita's invention relates to a microporous polyolefin membrane for use as a battery separator [abstract; col. 2, lines 48-60; col. 3, lines 1-27]. The microporous polyolefin membrane comprises a blend B of an ultra-high-molecular-weight polyolefin B-1 having a weight-average molecular weight of 1.5×10^6 to 15×10^6 and a polyolefin B-2 having a weight-average molecular weight of 1×10^4 to 1×10^6 . Preferably, the blend B contains 15 to 40 w% of B-

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1 to provide sufficient strength. Useful polyolefins include crystalline homopolymers or copolymers of ethylene, propylene, or blends thereof. Examples of the polyolefins include high density polyethylene (HDPE), etc. The membrane is formed by a melt extrusion process. Incorporation of propylene ethylene copolymer improves melt-down temperature and the characteristics of the membrane for battery separators.

For claims 1, 4 and 13, Takita is silent about: 1) the α -olefin co-monomer content of a HDPE copolymer and its melt index (MI), 2) the viscosity average molecular weight (M_v) of a HDPE, and 3) the M_v and the total α -olefin co-monomer content of the blend. However, regarding 1), since it is well known that a HDPE is a polymer of ethylene copolymerized with propylene (α -olefin) for a controlled density and properties, as evidenced by the reference Concise Encyclopedia of Polymer Science and Engineering, selecting a HDPE having a workable propylene (α -olefin) content as Takita's B-2 component is deemed to be either anticipated, or obviously provided by practicing the invention of prior art, motivated by the desire to obtain a workable density and properties, including MI, for forming a blend having required properties dictated by the same end use. Regarding 2), since the Takita teaches a blend of HDPE over a range of molecular weights, which inherently infers a range of viscosity average molecular weights M_v , selecting a HDPE with a workable range of M_v is deemed to be either anticipated by Takita, or an obvious routine optimization to one of ordinary skill in the art of battery separator, dictated by the same end use. Regarding 3), since Takita teaches a blend comprising HDPE, and discloses the same subject matter for the same end use (a HDPE blend for making a microporous battery separator), a workable M_v and total α -olefin co-monomer content in the blend are also deemed to be either anticipated by Takita, or an obvious

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optimization to one of ordinary skill in the art, motivated by the desire to obtain the beneficial properties such as melt processibility of a HDPE blend.

For claim 5, since Takita teaches a HDPE over a broad range of molecular weights, which inherently corresponds to a broad range of M_v , a blend of multiple M_v is also deemed to be either anticipated, or obviously provided by practicing the invention of prior art, because it is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.

For claims 7 and 8, since Takita teaches the same subject matter for the same use (microporous battery separator made of a polyethylene blend), workable rupture and shrinkage force of the battery separator are deemed to be either anticipated by Takita, or an obvious optimization to one of ordinary skill in the art of battery separator, motivated by the desire to obtain required properties dictated by end use.

For claim 9, since Takita teaches that a polymer capable of imparting a shut-down function at low temperature is included for lithium battery separators [col. 3, lines 58-61], a workable fusing temperature limit is deemed to be either anticipated by Takita, or an obvious optimization to one of ordinary skill in the art of a lithium battery separator, motivated by the desire to obtain a required safety feature for the end use.

For claim 10, Takita teaches that the final membrane has a thickness of 5 to 250 μm [col. 6, line 20].

For claim 11, Takita teaches that the membrane has a porosity of 45 to 95% [col. 4, line 3].

For claim 12, Takita teaches that the membrane has an air permeability of 50 to 400

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sec/100 cc [col. 4, line 55].

For claims 14, Takita teaches that blend B contains 15 to 40 w% of B-1 to provide sufficient strength, and B-1 has a weight-average molecular weight of 1.5×10^6 to 15×10^6 . Further, a low-density polyethylene is incorporated to impart a shut-down function for the battery separator. The low-density polyethylene (LDPE) useful for the present invention includes ethylene/ α -olefin copolymer, etc. [col. 3, lines 13-20]. A workable amount of LDPE is deemed to be either anticipated by Takita, or an obvious optimization to one of ordinary skill in the art of a lithium battery separator, motivated by the desire to obtain a required safety feature for the end use.

For newly added claims 15-24, absence of any unexpected end use properties, the various battery separator properties are deemed to be either anticipated by Takita, or obviously provided by practicing the invention of prior art for the same end use.

Response to Argument

5. Applicants stated at Remarks page 2 that

“The Patent Application Information Retrieval (PAIR) system lists the most recent correspondence from the Office dated November 30, 2007 as an Advisory Action. Although Applicants assume this is correct, the Office did not provide a cover sheet with this correspondence.”

The examiner regrets that a cover sheet was absent from the mailing of the Advisory. However, applicants have correctly noticed that the PAIR lists the missing the cover sheet. Since the full information is available to applicants, it is believed that the missing cover sheet has not caused harm to the application.

Applicants argue at page 4 that

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“Takita does not teach the claimed α -olefin comonomer content, or teach copolymers having the claimed α -olefin content. Takita read in light of the Encyclopedia does not teach the claimed α -olefin comonomer content. For at least these reasons, the anticipation rejection is overcome.”

However, applicants are reminded that the basis of rejection is 102(b)/103(a). While Takita is silent about the specific ranges of the claimed elements, Takita reasonably either anticipates the ranges, or workable ranges are obvious routine optimization to one of ordinary skill in the art, dictated by the same required properties for the same end use.

Applicants argue at page 5 that

“neither the cited references nor the Examiner identify any reasons why one skilled in the art would have modified the α -olefin content in Takita or the Encyclopedia in the manner recited by the claims. There is nothing in the prior art cited by the Examiner that provides any such reason or that could arguably suggest a reason. The cited art fails to identify improvements in any of the recited film properties as a reason to arrive at the recited α -olefin content.”

However, since Takita teaches that a workable range of molecular weights and related properties for the same end use, and it is well known that these limitations are result effective by the amount of α -olefin content in the HDPE, as evidenced by the Encyclopedia, the examiner maintains that selecting a workable amount of α -olefin content is an obvious routine optimization.

Applicants argue at page 5 that

“Takita does not teach microporous films with improved rupture temperatures, or provide reasons why the α -olefin content of a blend of HDPE copolymer and HDPE is relevant to the overall microporous film properties. One of ordinary skill in the art would not seek to modify α -olefin content of the whole blend of HDPE copolymer and HDPE based on Takita, to improve, *inter alia*, film rupture temperatures. Takita's deficiencies must be remedied by the Encyclopedia.”

However, since Takita teaches a product for the same end use, and specifically teaches an improved melt-down temperature, it is unseen how optimizing a workable HDPE component in

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the polymer blend for the same improved properties in the product for the same use is not obvious to one of ordinary skill in the art. In particular, as evidenced by the Encyclopedia that it is well known that α -olefin content is result effective for controlled HDPE density and properties, which, as a component, would have necessarily affected the properties of the whole blend of HDPE.

Applicants argue at page 6 that

“as stated in the attached Declaration under 37 C.F.R. § 1.132 of Masahiro OHASHI ("Declaration"), such relationships were not even known in the art at the filing date of the present invention. See Declaration at page 3.”

However, as evidenced by the Encyclopedia, α -olefin content is deliberately introduced to HDPE is old and well known, the examiner maintains the grounds of rejection as set forth above.

Applicants argue at page 6 that

“Applicants would like to direct the Examiner's attention to the evidence of unexpected results presented in the Declaration at pages 4-10.”

However, applicants results appear to merely affirm an optimization of Takita's invention. In particular, since Takita all the essential structure and composition limitations, the examiner asserts that the results are reasonably expected at the time the invention was made, i.e., not unexpected.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor S. Chang whose telephone number is 571-272-1474. The examiner can normally be reached on 7:00 am - 5:00 pm, Tuesday - Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on 571-272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Victor S Chang/
Primary Examiner, Art Unit 1794